NAME: FEEDWORKS DEVICE
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BACKGROUND OF THE INVENTION

This invention relates to a mechanism to move rigid flat material through a cutter so that the material remains in constant orientation to the cutter as it passes through the cutter and, more particularly, to a mechanism to move wooden boards containing defects through trimmer saws to yield useable boards.

It is known that boards with defects or wanes can be optically scanned and the largest piece of useable wood cut therefrom by computer analysis. See S. J. Oppeneer, U. S. Patent No. 4,794,963 and J. M. Idelsohn, U. S. Patent No. 4,207,472. The previous attempts to accomplish the goals of this invention have utilized standard rollers to move the boards past the cutting saws plus hold-down rollers from above and a fence along one side. See U. Moilanen, U. S. Patent No. 4,485,705 and E. G. Fornell, U. S. Patent No. 4,269,245. The way the prior art attempts to maintain constant orientation of the boards to the trimming saws is by means of gripping clamps which damage the wood being trimmed. See A. U. Jones, U. S. Patent No. 5,088,363 and G. W. Head Jr., U. S. Patent No. 5,381,712.

Another known means for transporting the material to the cutter is a slat-bed transport device, which consists of multiple parallel chains on which cross "slats" are affixed at regular intervals along a continuous loop of traveling chain. The chains usually ride in a track and there are 'V' block attachments on the underside of the cross slats which ride upon a 'V' guide. This means of transporting material to a cutter has many complex parts which are more expensive to manufacture and to maintain than this invention and require regular lubrication, which lubricant can transfer to the material being transported and stain it. The metal slats do

not maintain the alignment of the material with the cutter unless they are equipped with spikes or a rough surface which mars the material to be cut just as do the gripping clamps of referred to above.

The primary object of this invention is to provide a device to maintain the precise orientation of a board to cutting or shaping mechanisms and to move the board through the cutting or shaping mechanisms at a constant rate without marring the surface of the wood.

SUMMARY OF INVENTION

These objects are achieved by this invention in that boards are fed through cutting saws, being adjustable in distance from each other, by means of an input and an out-put continuous drive conveyor belt with non-skid face being maintained in constant alignment with the cutting saws by means of Guide 'V' belts bonded to their reverse side, which 'V' belts communicate with corresponding 'V' grooves in the power rollers and the rollers of the feed bed, and constant alignment with each other by a timing/drive belt which transfers the motor drive to the inside rollers of the output and the input sides, while spring powered hold-down rollers press the board against the non-skid face of the belt, so that the board does not move side to side or chatter up and down when it is being cut.

The novel features of the invention will be best understood from the following description in light of the accompanying drawings. While particular embodiments of the present invention are shown and described, it will be obvious to those skilled in the art that changes and modifications may be made without departing from this invention in its broader aspects and, therefore, the aim of the appended claims is to cover all such changes and modifications as fall within the true spirit and scope of this invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side aspect view of the Feedworks Device from the input end;

FIG. 2 is a side aspect view of the Feedworks Device from the output end;

FIG. 3 is a break out view of the saws arrangement from above;

FIG. 4 is a break out view of a roller and the bed of the Feedworks Device;

FIG. 5 is an aspect view of the surface of the conveyor belt which contacts the product to be cut;

FIG. 6 is an aspect view of the surface of the conveyor belt opposite from that shown in Figure 5;

FIG. 7 is a cross sectional view of the conveyor belt;

FIG. 8 is an aspect view of an alternative form of the Feedworks Device from the output end.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

With specific reference to Figures 1 and 2, the Feedworks Device (1) is shown being comprised of an input cover (4), a right side cover (3), a left side cover (5), a top cover (2) with window (7) of opaque shatter-proof material, and an output end cover (6) of rigid material, such as steel, and strengthened by reinforcement plates (40) as necessary to accommodate the operating elements. The preferred embodiment thereof being comprised of an input continuous drive conveyor belt (10) and an output continuous drive conveyor belt (41), each of identical composition and having a non-skid top surface (28), such as No. 37 Scandera Red Carbox Rough Top on 3 ply 135 pound polyester 9/32 inch thick with an underside of Friction Surface (Caroxilated nytril X F.S.), a bottom surface (29) to which is bonded one or more Guide 'V' belts (30), such as a Browning Manufacturing Company Grip Notch grip belt commonly known as an "A" section belt and having scallop shaped cuts partially through its thickness across its width and regularly spaced along its length, parallel to ~~their lengths~~.

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The one continuous drive conveyor belt (10) travels around an inside feed roller on the

input side (42) and a feed roller at the input end (8) and the other continuous drive conveyor belt (41) travels around an inside feed roller at the output side (43) and a feed roller at the output end (34). The distance from the respective inside and end rollers being adjustable at the feed roller mount (9), (16) so as to maintain proper tension on the continuous drive conveyor belt so that it does not slip on the rollers.

With reference to Figures 4, 5, and 6, it is shown said rollers are provided with one or more 'V' grooves (31) to accept the guide 'V' belt (30), as is the feed bed (32) provided with one or more 'V' grooves (33) to accept the guide 'V' belt (30) on the bottom surface (29) of the continuous drive conveyor belt (10, 41) so that the continuous drive conveyor belt remains in constant horizontal relationship to the feed rollers and the circular saw blade(s) (23, 24) or shaping tool(s) (46). The speed of the input continuous drive conveyor belt (10) is matched with the speed of the output continuous drive conveyor belt (41) by means of a timing belt (15) between the powered shaft of the inside feed roller on the output end (13), powered by a feed roller drive motor (21), to the slaved shaft of the inside feed roller on the input end (14), while the feed rollers at the input end (8) and the feed roller at the output end (34) are turned by the continuous drive conveyor belts. Thus all feed rollers have the same operating revolutions per minute (RPM).

With specific reference to Figure 3, the relationship between the input continuous drive conveyor belt (10) and the output continuous drive conveyor belt (41) and the circular saw blade(s) (23, 24) or shaping tool(s) (46), adjustably set along the length of the saw drive shaft (25) by means such as an adjustable mounting screw for the saw blade (36) removably set into a mounting channel (35) which runs along the length of the saw drive shaft (25) inside the saw drive shaft mount (26) on the inside of the right side cover (3) and the left side cover (5), with the saw drive shaft extending through the right side cover (3) so that the saw drive shaft slave

pulley (38) mounted at the end of the saw drive shaft (25) communicates to the saw blade drive motor (27) via a saw drive shaft drive belt (39) to the saw motor drive pulley (37).

With reference to Figures 1 and 3, it is shown that once a wooden board (44) or other flat, rigid, cuttable piece of material enters the Feedworks Device (1) on the input continuous drive conveyor belt (10) over the feed roller at the input end (8), it is held in a fixed horizontal relationship to the circular saw blade(s) (23, 24) or shaping tool(s) (46) by the non-skid top surface (28) of the input continuous drive conveyor belt (10) and a hold down roller at the input end (11) and an inside hold down roller on the input side (22), said hold down rollers having non-marring surface and applying pressure to the top of the wooden board (44) by means of a spring loaded arm (12, 45) while the Feedworks Device (1) has a similar output continuous drive conveyor belt (41) with an inside hold down roller on the output side (17) and a hold down roller at the output end (19), applying sufficient pressure to the top of the sawn pieces of the wooden board (44) by means of a spring or pneumatic cylinder loaded arm (12, 18, 20, 45), so that the wooden board (44) being cut maintains a constant orientation to the saw blade (23, 24) or shaping means.

With reference to Figure 8, an alternative embodiment of the invention is comprised of a single non-skid continuous conveyor belt (47) which spans the input (4) to the output (6) end covers in situations where the cutting or shaping means (46) is above and does not interfere with the non-skid continuous conveyor belt. Such alternative cutting or shaping means include router cutting tools and overhead saws.

Also in reference to Figures 2 and 8, it is apparent that the single saw drive shaft (25) can be replaced with multiple saw or shaper cutters (49), each with its own power drive means, such as arbor motors (48) and located along the run of the continuous drive conveyor belt(s) (10, 41, 47) to cut, shape, or trim the edges, of the wooden board.